UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,940	03/15/2004	Hidenori Usuda	9319H-000721	1285

27572 7590 02/23/2006

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER	
GARCIA JR, RENE	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/800,940	USUDA, HIDENORI	
	Examiner	Art Unit	
	Rene Garcia, Jr.	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 8-26* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/25/06; 3/15/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Information Disclosure Statement

1. The information disclosure statement filed 26 January 2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

No Communication from Korean Patent Office regarding counterpart application has been received by office.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitahara et al. (US 6,328,395).

Kitahara et al. discloses the following claimed limitations:

*regarding claim 1, method of controlling drive of a function liquid droplet ejection head/**print head, 10/** having disposed therein a plurality of nozzle arrays with a different function liquid droplet ejection amount per unit nozzle (col. 5, lines 17-20; col. 2, lines 5-9)

*wherein, in one print cycle, drive of the plurality of nozzle arrays is controlled by using a single drive signal having a plurality of ejection pulses corresponding to the plurality of nozzle arrays (col. 5, lines 57-60; col. 6, line 66- col. 7, line 27)

*regarding claim 2, plurality of ejection pulses have waveforms which are different from each other in accordance with specifications of corresponding nozzle arrays (fig. 4; col. 6, line 66 – col. 7, line 27)

*regarding claim 8, function liquid droplet ejection apparatus/**ink jet printer/** which selectively ejects function liquid droplets while performing a relative movement between a function liquid droplet ejection head into which a function liquid is introduced and a workpiece, the apparatus comprising: (col. 5, line 17-20)

*function liquid droplet ejection head/**print head, 10/** having disposed therein a plurality of nozzle arrays with a different function liquid droplet ejection amount per unit nozzle (col. 5, lines 17-21; col. 2, lines 4-9)

*control means for controlling drive of the plurality of nozzle arrays by using a single drive signal **/drive signal generator circuit, 8/** (col. 4, lines 30-32)

*wherein the drive signal has a plurality of ejection pulses corresponding to the plurality of nozzle arrays in one print cycle (col. 5, lines 57-60; fig. 4)

*regarding claim 9, plurality of ejection pulses have waveforms which are different from each other in accordance with specifications of corresponding nozzle arrays (fig. 4; col. 6, line 66- col. 7, line 27)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara et al. (US 6,328,395) in view of Minowa et al. (US 2001/0002134).

Kitahara et al. discloses the claimed limitations except for the following:

*regarding claims 3 and 10, control means controls the plurality of nozzle arrays by using an identical ejection pulse in case of performing flushing which is function recovery processing by waste discharging of liquid droplets from all nozzles

Minowa et al. disclose the following:

*regarding claims 3 and 10, control means controls the plurality of nozzle arrays by using an identical ejection pulse in case of performing flushing which is function recovery processing by waste discharging of liquid droplets from all nozzles (paragraphs 0057 and 0055) for the purpose of preventing nozzle clogging and maintain printing performance

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize control means controls the plurality of nozzle arrays by using an identical ejection pulse in case of performing flushing which is function recovery processing by waste discharging of liquid droplets from all nozzles as taught by Minowa et al. into Kitahara et al. for the purpose of preventing nozzle clogging and maintain printing performance.

6. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara et al. (US 6,328,395) in view of Junhua (US 200/0085962).

Kitahara et al. discloses the claimed limitations except for the following:

*regarding claim 4, drive signal has a micro oscillation pulse which subjects a function liquid to form a meniscus of each nozzle to micro oscillation, and wherein only one waveform of the micro oscillation pulse is inputted in said one print cycle

*regarding claim 5, micro oscillation pulse is inputted before input of the plurality of ejection pulses in said one print cycle

Junhua disclose the following:

*regarding claim 4, drive signal has a micro oscillation pulse**/vibrating pulse/** which subjects a function liquid to form a meniscus of each nozzle to micro oscillation, and wherein only one waveform of the micro oscillation pulse is inputted in said one print cycle (paragraph 0028 & 0086; fig. 3) for the purposes agitating ink in the vicinity of nozzle orifice.

*regarding claim 5, micro oscillation pulse is inputted before input of the plurality of ejection pulses in said one print cycle (paragraph 0028 & 0086; fig. 3) for the purposes agitating ink in the vicinity of nozzle orifice.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize drive signal has a micro oscillation pulse which subjects a function liquid to form a meniscus of each nozzle to micro oscillation, and wherein only one waveform of the micro oscillation pulse is inputted in said one print cycle; and micro oscillation

pulse is inputted before input of the plurality of ejection pulses in said one print cycle as taught by Junhua into Kitahara et al. for the purpose agitating ink in the vicinity of nozzle orifice.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara et al. (US 6,328,395) in view of Takahashi (US 6,527,354).

Kitahara et al. discloses the claimed limitations except for the following:

*regarding claim 6, drive signal has a damping pulse for damping residual oscillation of a pressure generating elementwhich generates pressure fluctuations in a cavity communicated with each nozzle, and wherein, in said one print cycle, the damping pulse is inputted after input of the plurality of ejection pulses and has a waveform corresponding to a waveform of the last inputted ejection pulse

Junhua disclose the following:

*regarding claim 6, drive signal has a damping pulse/**ink droplet reducing pulse, 2/** for damping residual oscillation of a pressure generating element/**actuator substrate, 601/** (col. 3, line 36) which generates pressure fluctuations in a cavity communicated with each nozzle, and wherein, in said one print cycle, the damping pulse is inputted after input of the plurality of ejection pulses and has a waveform corresponding to a waveform of the last inputted ejection pulse (col. 5, lines 25-32; fig. 1)

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize drive signal has a damping pulse for damping residual oscillation of a pressure generating element which generates pressure fluctuations in a cavity communicated with each nozzle, and wherein, in said one print cycle, the damping pulse is inputted after input of the plurality of ejection pulses and has a waveform corresponding to a

waveform of the last inputted ejection pulse as taught by Takahashi into Kitahara et al. for the purpose preventing meniscus from ejecting and reducing size of droplet.

8. Claims 11-20 and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara et al. (US 6,328,395) in view of Nakamura et al. (US 6,933,958).

Kitahara et al. discloses the claimed limitations except for the following:

*regarding claim 11, electro-optic device manufactured by using the function liquid droplet ejection apparatus according to claim 8

*regarding claim 12, method of manufacturing a liquid crystal display device, in which a multiplicity of filter elements are formed on a color filter substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing filter materials of respective colors into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the filter materials, whereby the multiplicity of the filter elements are formed

*regarding claim 13, method of manufacturing an organic EL device, in which an EL layer is formed in each of a multiplicity of picture element pixels on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing luminescent materials of respective colors into the function liquid droplet ejection head

*and performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the luminescent materials, whereby the multiplicity of EL layers are formed

*regarding claim 14, method of manufacturing an electron emission device, in which a multiplicity of phosphors are formed on electrodes by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing fluorescent materials of respective colors into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the electrodes to selectively eject the fluorescent materials, whereby the multiplicity phosphors are formed

*regarding claim 15, method of manufacturing a PDP device, in which phosphors are formed in each of a multiplicity of concave portions on a rear substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing fluorescent materials of respective colors into the function liquid droplet ejection head

*and performing a relative scanning between the function liquid droplet ejection head and the rear substrate to selectively eject the fluorescent materials, whereby the multiplicity of the phosphors are formed

*regarding claim 16, method of manufacturing an electrophoretic display device, in which migrating bodies are formed in each of a multiplicity of concave portions on electrodes by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing migrating body materials of respective colors into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the electrodes to selectively eject the migrating body materials, whereby the multiplicity of the migrating bodies are formed

*regarding claim 17, method of manufacturing a color filter, in which a color filter having disposed therein a multiplicity of filter elements is manufactured by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing filter materials of respective colors in the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the filter materials, whereby the multiplicity of the filter elements are formed

*regarding claim 18, overcoat film which covers the multiplicity of filter elements is formed, said method further comprising the steps of:

*introducing, after the filter elements are formed, a translucent coating material into the function liquid droplet ejection head

*performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the coating material, whereby the overcoat film is formed

*regarding claim 19, manufacturing an organic EL in which a multiplicity of picture element pixels inclusive of EL layers are arranged on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing luminescent materials of respective colors into the function liquid droplet ejection head

*performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the luminescent materials, whereby the multiplicity of EL layers are formed

*regarding claim 20, multiplicity of pixel electrodes corresponding to the EL layers are formed between the multiplicity of EL layers and the substrate, said method further comprising the steps of:

*introducing a liquid electrode material into the function liquid droplet ejection head

*performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the liquid electrode material, whereby a multiplicity of the pixel electrodes are formed

*regarding claim 22, forming a spacer, in which a multiplicity of particulate spacers are formed to constitute a minute cell gap between two substrates, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing a particle material constituting the spacers into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and at least one of the substrates to selectively eject the particle material, whereby the spacers are formed on the substrate

*regarding claim 23, forming a metallic wiring on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing a liquid metal material into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the liquid metal material, whereby the metallic wiring is formed

*regarding claim 24, forming a lens, in which a multiplicity of microlenses are formed on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing a lens material into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the lens material, whereby the multiplicity of microlenses are formed

*regarding claim 25, manufacturing a resist of an arbitrary shape on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing a resist material into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the resist material, whereby the resist is formed

*regarding claim 26, forming a light diffusion body, in which a multiplicity of light diffusion bodies are formed on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:

*introducing a light diffusion material into the function liquid droplet ejection head

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the light diffusion material, whereby the multiplicity of light diffusion bodies are formed

Nakamura et al. disclose the following:

*regarding claim 11, electro-optic device manufactured by using the function liquid droplet ejection apparatus according to claim 8 (col. 39, lines 7-12) for the purpose of manufacturing an electro-optic device

*regarding claim 12, method of manufacturing a liquid crystal display device, in which a multiplicity of filter elements are formed on a color filter substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 39, lines 7-12)

*introducing filter materials of respective colors into the function liquid droplet ejection head (col. 39, lines 13-22)

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the filter materials, whereby the multiplicity of the filter elements are formed (col. 27, lines 49-63) for the purpose of manufacturing a liquid crystal display

*regarding claim 13, method of manufacturing an organic EL device, in which an EL layer is formed in each of a multiplicity of picture element pixels on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 5, lines 54-63, col. 37, lines 18-28; col. 42-44)

*introducing luminescent materials of respective colors into the function liquid droplet ejection head (col. 49, line 54; col. 39, line 50)

*and performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the luminescent materials, whereby the multiplicity of EL layers are formed (col. 27, lines 49-63) for the purpose of manufacturing an organic EL device

*regarding claim 14, method of manufacturing an electron emission device, in which a multiplicity of phosphors are formed on electrodes by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 4, lines 47-56; col. 48, lines 20-27)

*introducing fluorescent materials of respective colors into the function liquid droplet ejection head (col. 48, lines 20-27)

*performing a relative scanning between the function liquid droplet ejection head and the electrodes to selectively eject the fluorescent materials, whereby the multiplicity phosphors are formed (col. 27, lines 49-63) for the purpose of manufacturing an electron emission device

*regarding claim 15, method of manufacturing a PDP device, in which phosphors are formed in each of a multiplicity of concave portions on a rear substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 4, lines 57-67; col. 48, lines 28-35)

*introducing fluorescent materials of respective colors into the function liquid droplet ejection head (col. 48, lines 28-35)

*and performing a relative scanning between the function liquid droplet ejection head and the rear substrate to selectively eject the fluorescent materials, whereby the multiplicity of the phosphors are formed (col. 27, lines 49-63) for the purpose of manufacturing a PDP device

*regarding claim 16, method of manufacturing an electrophoretic display device, in which migrating bodies are formed in each of a multiplicity of concave portions on electrodes by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 5, lines 1-11; col. 48, lines 36-44)

*introducing migrating body materials of respective colors into the function liquid droplet ejection head (col. 48, lines 36-44)

*performing a relative scanning between the function liquid droplet ejection head and the electrodes to selectively eject the migrating body materials, whereby the multiplicity of the migrating bodies are formed (col. 27, lines 49-63) for the purpose of manufacturing an electorphoretic display device.

*regarding claim 17, method of manufacturing a color filter, in which a color filter having disposed therein a multiplicity of filter elements is manufactured by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 37, lines, 34-42; col. 37, lines 18-28; col. 5, lines 26-34)

*introducing filter materials of respective colors in the function liquid droplet ejection head (col. 37, lines 34-42)

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the filter materials, whereby the multiplicity of the filter elements are formed (col. 27, lines 49-63) for the purpose of manufacturing a color filter

*regarding claim 18, overcoat film which covers the multiplicity of filter elements is formed, said method further comprising the steps of: (col. 37, lines 44-50)

*introducing, after the filter elements are formed, a translucent coating material into the function liquid droplet ejection head (col. 25, lines 60-64)

*performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the coating material, whereby the overcoat film is formed (col. 27, lines 49-63) for the purpose of manufacturing a color filter

*regarding claim 19, manufacturing an organic EL in which a multiplicity of picture element pixels inclusive of EL layers are arranged on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 5, lines 54-63; col. 37, lines 18-28; col. 39, lines 42-44; fig. 52-66)

*introducing luminescent materials of respective colors into the function liquid droplet ejection head (col. 49, line 54; col. 39, line 50)

*performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the luminescent materials, whereby the multiplicity of EL layers are formed (col. 27, lines 49-63) for the purpose of manufacturing an organic EL device

*regarding claim 20, multiplicity of pixel electrodes corresponding to the EL layers are formed between the multiplicity of EL layers and the substrate, said method further comprising the steps of: (col. 40, lines 8-11)

*introducing a liquid electrode material into the function liquid droplet ejection head (coll 6, lines 7-16; col. 39, line 3 –7)

*performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the liquid electrode material, whereby a multiplicity of the pixel electrodes are formed (col. 27, lines 49-63) for the purpose of manufacturing an organic EL device

*regarding claim 22, forming a spacer, in which a multiplicity of particulate spacers are formed to constitute a minute cell gap between two substrates, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 6, lines 26-37; col. 48, lines 50 –62)

*introducing a particle material constituting the spacers into the function liquid droplet ejection head (col. 48, lines 50-62)

*performing a relative scanning between the function liquid droplet ejection head and at least one of the substrates to selectively eject the particle material, whereby the spacers are formed on the substrate (col. 27, lines 49-63) for the purpose of forming a spacer

*regarding claim 23, forming a metallic wiring on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 6, lines 38-46; col. 48, line 63 – col. 49, line 8)

*introducing a liquid metal material into the function liquid droplet ejection head (col. 48, line 63 – col. 49, line 8)

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the liquid metal material, whereby the metallic wiring is formed (col. 27, lines 49-63) for the purpose of forming a metallic wiring on a substrate

*regarding claim 24, forming a lens, in which a multiplicity of microlenses are formed on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 6, lines 47-55; col. 49, lines 8-15)

*introducing a lens material into the function liquid droplet ejection head (col. 49, lines 8-15)

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the lens material, whereby the multiplicity of microlenses are formed (col. 27, lines 49-63) for the purpose of forming a lens

*regarding claim 25, manufacturing a resist of an arbitrary shape on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 6, lines 56-63; col. 49, lines 16-25)

*introducing a resist material into the function liquid droplet ejection head (col. 49, lines 16-25)

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the resist material, whereby the resist is formed (col. 27, lines 49-63) for the purpose of manufacturing a resist

*regarding claim 26, forming a light diffusion body, in which a multiplicity of light diffusion bodies are formed on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: (col. 6, line 64-col. 7, line 5; col. 49, lines 26-35)

*introducing a light diffusion material into the function liquid droplet ejection head (col. 49, lines 26-35)

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the light diffusion material, whereby the multiplicity of light diffusion bodies are formed (col. 27, lines 49-63) for the purpose of forming a light diffusion body

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a method of manufacturing an electro-optic device manufactured by using the function liquid droplet ejection apparatus according to claim 8; method of manufacturing a liquid crystal display device, in which a multiplicity of filter elements are formed on a color filter substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing filter materials

of respective colors into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the filter materials, whereby the multiplicity of the filter elements are formed; method of manufacturing an organic EL device, in which an EL layer is formed in each of a multiplicity of picture element pixels on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing luminescent materials of respective colors into the function liquid droplet ejection head, and performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the luminescent materials, whereby the multiplicity of EL layers are formed; method of manufacturing an electron emission device, in which a multiplicity of phosphors are formed on electrodes by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing fluorescent materials of respective colors into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the electrodes to selectively eject the fluorescent materials, whereby the multiplicity phosphors are formed; method of manufacturing a PDP device, in which phosphors are formed in each of a multiplicity of concave portions on a rear substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing fluorescent materials of respective colors into the function liquid droplet ejection head, and performing a relative scanning between the function liquid droplet ejection head and the rear substrate to selectively eject the fluorescent materials, whereby the multiplicity of the phosphors are formed; electrophoretic display device, in which migrating bodies are formed in each of a multiplicity of concave portions on electrodes by using the function liquid droplet ejection

apparatus according to claim 8, the method comprising the steps of: introducing migrating body materials of respective colors into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the electrodes to selectively eject the migrating body materials, whereby the multiplicity of the migrating bodies are formed; a method of manufacturing a color filter, in which a color filter having disposed therein a multiplicity of filter elements is manufactured by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing filter materials of respective colors in the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the filter materials, whereby the multiplicity of the filter elements are formed; overcoat film which covers the multiplicity of filter elements is formed, said method further comprising the steps of: introducing, after the filter elements are formed, a translucent coating material into the function liquid droplet ejection head, performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the coating material, whereby the overcoat film is formed; manufacturing an organic EL in which a multiplicity of picture element pixels inclusive of EL layers are arranged on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing luminescent materials of respective colors into the function liquid droplet ejection head, performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the luminescent materials, whereby the multiplicity of EL layers are formed; multiplicity of pixel electrodes corresponding to the EL layers are formed between the multiplicity of EL layers and the substrate, said method further comprising the steps of: introducing a liquid electrode material

into the function liquid droplet ejection head, performing relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the liquid electrode material, whereby a multiplicity of the pixel electrodes are formed; forming a spacer, in which a multiplicity of particulate spacers are formed to constitute a minute cell gap between two substrates, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of:, introducing a particle material constituting the spacers into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and at least one of the substrates to selectively eject the particle material, whereby the spacers are formed on the substrate; forming a metallic wiring on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing a liquid metal material into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the liquid metal material, whereby the metallic wiring is formed; forming a lens, in which a multiplicity of microlenses are formed on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing a lens material into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the lens material, whereby the multiplicity of microlenses are formed, manufacturing a resist of an arbitrary shape on a substrate by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing a resist material into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the resist material,

whereby the resist is formed; and forming a light diffusion body, in which a multiplicity of light diffusion bodies are formed on a substrate, by using the function liquid droplet ejection apparatus according to claim 8, the method comprising the steps of: introducing a light diffusion material into the function liquid droplet ejection head, performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the light diffusion material, whereby the multiplicity of light diffusion bodies are formed as taught by Nakamura et al. into Kitahara et al. for the purposes of manufacturing an electro-optic device; manufacturing a liquid crystal display; manufacturing an organic EL device; manufacturing an electron emission device; manufacturing a PDP device; manufacturing an electorphoretic display device; manufacturing a color filter; manufacturing an organic EL device; forming a spacer; forming a metallic wiring on a substrate; forming a lens; manufacturing a resist; and forming a light diffusion body.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara et al. (US 6,328,395) modified by Minowa et al. (US 2001/0002134) as applied to claim 20 above, and further in view of Yamaguchi et al. (US 6,364,450).

Kitahara et al. modified by Minowa et al. disclose the following claimed limitations:

*regarding claim 21, introducing, after the EL layers are formed, the liquid electrode material into the function liquid droplet ejection head (col. 6, lines 7-16)

*performing a relative scanning between the function liquid droplet ejection head and the substrate to selectively eject the liquid electrode material, whereby the counter electrode is formed (col. 27, lines 49-63)

Kitahara et al. modified by Minowa et al. does not disclose the following claimed limitations:

*regarding claim 21, counter electrode is formed so as to cover the multiplicity EL layers

Yamaguchi et al. discloses the following:

*regarding claim 21, counter electrode is formed so as to cover the multiplicity EL layers (col. 6, lines 49-67; col. 11, lines 19-51) for the purpose of manufacturing an organic EL device.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a counter electrode is formed so as to cover the multiplicity EL layers as taught by Yamaguchi et al. into Kitahara et al. modified by Minowa et al. for the purpose of manufacturing an organic EL device.

Allowable Subject Matter

10. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The primary reason for the allowance of claim 7 is the inclusion of the method steps of a liquid droplet ejection head that includes plurality of nozzle arrays include a first nozzle array which ejects a first function liquid droplet ejection amount and a second nozzle array which ejects a second function liquid droplet ejection amount which is smaller than the first function liquid droplet ejection amount, and wherein a number of nozzles in the second nozzle array is two times the number of nozzles in the first nozzle array. It is these steps found in each of the claims,

as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Otsuka et al. includes nozzle arrays printing different drop sizes and waveforms to drive nozzles.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rene Garcia, Jr. whose telephone number is (571) 272-5980. The examiner can normally be reached on M-F 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rene Garcia Jr
16 February 2006

K. FEGGINS
PRIMARY EXAMINER